

Response to Reviewer:

Dear Editor,

We have completed the minor revisions required by the reviewers #2, in particular, adding text about the casual link to tentatively explain changes in the backscattering coefficient over time. We thank again the reviewer for the detailed comments. Note that we did not use the track change for minor typos highlighted by the reviewer, but we have accounted for all of them.

We hope that the manuscript will be accepted for publication in Biogeosciences.

Best Regards,

Emmanuel Devred

Reviewer #1:

We thank the reviewer for accepting the manuscript for publication as is.

Reviewer #2:

We are grateful to reviewer #2 for providing another set of comments that will help making some last, but not negligible, improvements to the manuscript.

I thank the authors for taking care of my previous comments. I found the paper much easier to read and follow. I recommend the publication of this paper after considering minor comments:

L162 to 169: this paragraph may be moved at the end of section 2.5.2 where the calculation of Chl standing stock is defined and where it is explained why P1 is independent of possible seal influence

We have followed the reviewer recommendation and moved the paragraph between Line162-169 at the end of section 2.5.2

Line 164: why do you use the SW box to derive the slope of Chl-a whereas in Line 417 and in Fig 7 this is the NE box which is used? It is maybe a typo.

In Figure 7, the NE box is showed only as a reference to emphasize the different annual cycle of chl-a in the vicinity of Sable Island compare to the control boxes, the NE box in that case. The use of the SW or the NE box does not provide very different results as the slope for SW and NE in winter are 0.015 and 0.011 respectively

L281: as you developed a little bit your interpretation for adg Line 276-277 (which was great! Please keep it). The same kind of explanation for bbp would be helpful

We have added some explanation to the seasonal variation of bbp

L 331: Can you provide some possible interpretations of the causal links of adg and bbp trends with those of Chl during wintertime?

We have added two sentences to provide possible explanation for the findings. As demonstrated for the seasonal cycle, adg variations seemed to be related to chl-a, while bbp seemed to be driven by hydrodynamic and resuspension of particles (non-living) in the water column. The increase in adg is explained by the increase in chl-a, while the decrease in bbp is supported by changes in physical forcing on the Scotian Shelf and notably an increase in stratification that impedes (Hebert et al. 2021) particle resuspension to reach the surface waters.

Figure 9: the left y-axis could be more extended upward to reach approximately the highest values. You may also consider to adapt the right y-axis, as it was in the initial version. Right now, it looks like the seal fertilization induced Chl seems stable, the increase is not visible

Thank you for the comment, we have updated the figure and adapted the axis to match the initial version of the figure 09

Conclusion section:

L 449: it is written that "no trends in particulate bbp and adg were markedly different from the surrounding environment". Not sure to understand... Figure 4 shows that there are trends in the 3 variables during wintertime, which for all of them are stronger around SI than in the SE and NE regions.

Also, in this section the bbp and adg patterns are only descriptive, can you add some causal links of adg and bbp trends with those of Chl.

The text about absence of trends in an oversight from the original version of the manuscript, in which we presented the annual trends for chl-a, adg and bbp that did not show any significant trends. We have corrected the text and added some explanation about the casual links between the variables.

L 459: replace "strong" by "good"

Done

Typo:

Line 20: "during winter"

Text corrected

Line 30: I am not sure that Signorini et al 1999 deal with benthic resuspension

L 140: climatologies

Text corrected

L 146: for boxes 1, 2, 3 and 4 , check with Figure 2 where it is written group 1= boxes 1 to 3

The legend has been corrected and reflects the text and the manner we carried out the computation

L 147: you could add at the end of the sentence "as illustrated in Figure 2"

Text added

L 214: "between males and females the same". I am not sure to understand "the same"

This text has been deleted

L 267: the shelf showed

Text corrected

L 305: in winter

Text corrected

L 313 in spring

Text corrected

L 322: three "ROIs", please define

Definition of the three ROIs has been added

L 382: the seal supported the chl-a annual standing stock ...

Text corrected

L 418: corresponded

Text corrected

L 423: differences occurred

[Text corrected](#)

L 424: fertilization provided

[Text corrected](#)

L 430: provide a good agreement

[Text corrected](#)

L 441: around SI, region referred to as ...

[Text corrected](#)

L 441: occurred

[Text corrected](#)